CHAPTER 13

CODEX 3600 SERIES MODEM

SECTION I. DESCRIPTION AND LEADING PARTICULARS

13.1.1 INTRODUCTION

The Codex 3600 Series modem (figure 13.1.1) supports both point-to-point and multipoint circuits for analog and digital applications. In the ASOS environment, the 3600 modem interfaces with the Federal Aviation Administration (FAA) ADAS via the Data Multiplexer Network in both point-to-point and multipoint circuits. The particular circuit is ASOS site-specific. Typical point-to-point and multipoint circuits are described in Section IV.

When operating as an analog leased line device, the 3600 modem can achieve speeds in excess of the industry standard of 19.2 kbps. This extended rate capability is achieved through a coding/equalization technique called Trellis Precoding. This extended rate also provides for line testing and transmission speed adjustment depending on prevailing line conditions, enabling the device to support speeds of 21.6 kbps. A speed of 24.0 kbps can be achieved under optimum line conditions. In addition to these higher speeds, the 3600 modem offers improved performance at 19.2 kbps. Through its Digital Interface option, the 3600 modem operates at both substrate (2.4, 4.8, 9.6, and 19.2 kbps) and standard rate (56.0 kbps) digital transmission speeds.

The 3600 modem is a modular system that can be customized with a variety of hardware and software options to expand in step with communications requirements. These options enable the 3600 modem to be custom-configured as an analog leased line device or as a digital service unit, both with time division multiplexing and integrated restoral backup. Different Flex-cartridge operating sets and options can be used to provide varying levels of control in 3600 Series applications. The Flex-cartridge is removable and can be replaced with a cartridge containing software updates and configuration changes to accommodate new communications circuits. In the ASOS environment, one of two Flex-cartridges is used: Premium or Standard. These cartridges are ASOS site-specific. The Premium Flex-cartridge provides for point-to-point communications using TURBO PP mode at 19.2 kbps, and the Standard Flex-cartridge provides for multipoint operation in multipoint-slave (MP-S) mode of operation at 4.8 kbps. It should be noted that Premium Flex-cartridge mode V.33 is used on some FAA circuits. Table 13.1.1 lists the Codex 3600 Series operating set characteristics.

13.1.2 PHYSICAL DESCRIPTION

13.1.2.1 **General Description**. The 3600 modem is Government-furnished equipment (GFE) measuring 3.5 inches high, 17.25 inches wide, and 17.5 inches deep and is installed in position 1A1 above the VME rack in the acquisition control unit (figure 13.1.2).

The modem is self-operating and, under normal conditions, needs no operator intervention. The front panel of the device, normally covered with a dress panel (figure 13.1.3), is hinged so that it can be opened to gain access to the circuit boards of the modem as well as a removable component housing (called a Flex-cartridge) containing multiple banks of memory devices. The initial Flex-cartridge is factory-installed; however, software upgrades can be installed by removing and replacing the Flex-cartridge.

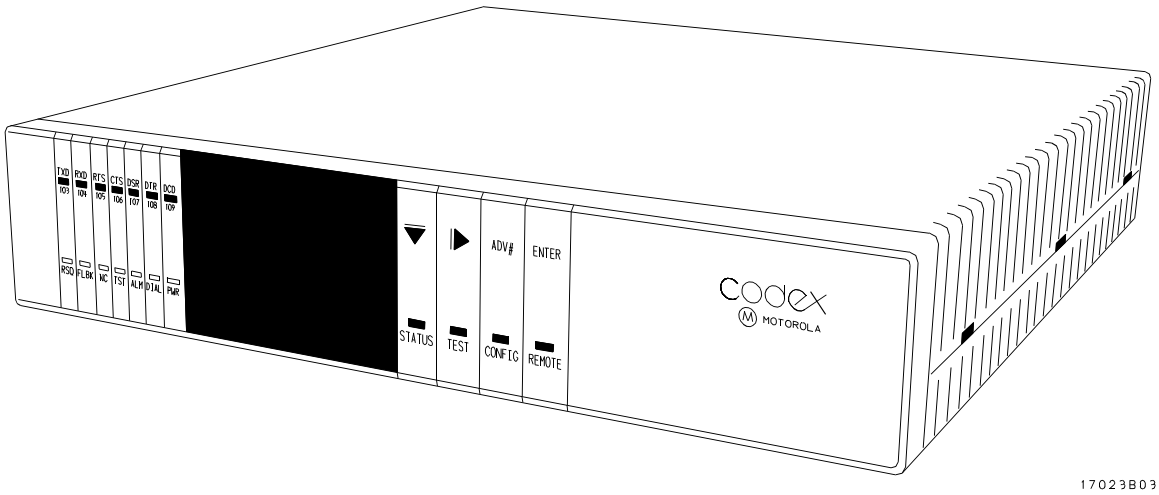

Figure 13.1.1. Codex Series 3600 Modem

Table 13.1.1. Codex 3600 Series Modem Specifications

Operating Mode	Data Rate (kbps)	Transmit Carrier Mode	Point-to-Point/ Multipoint	Training Time	Baud Rate (Hz)	Equalization Recovery Method	Unique Features
TURBO PP	24.0 21.6 19.2* 16.8 14.4 12.0 9.6	Constant	Point-to-point	Normal/ short	3200 2954 2743* 2400	Round robin (3 to 7 sec)	Extended high-speed performance through combination of Trellis Precoding and line probing
V.33	14.4 12.0	Constant	Point-to-point	1393 ms	2400	Round robin (2.6 to 4 sec)	End-to-end compatible with any CCITT V.33 device (without network control)
PP/CI	9.6 7.2 4.8	Constant	Point-to-point	253 ms	2400	Round robin (1 to 2 sec)	Improved signal constellation (compared to V.29)
V.29	9.6 7.2 4.8	Constant	Point-to-point	253 ms	2400	Round robin (1 to 2 sec)	End-to-end compatible with any CCITT V.29 device (without network control)
MP-M (master)	9.6 7.2 4.8	Constant	Multipoint	253 ms	2400	None (Retrain expected with each outbound message)	Ability to accept different inbound rates from slaves (MIR) MQSB
MP-S (slave)	4.8	Controlled (switched)	Multipoint	17 ms	2400*	Train on data (2 to 15 sec)	Train on data (TOD)

*ASOS configuration

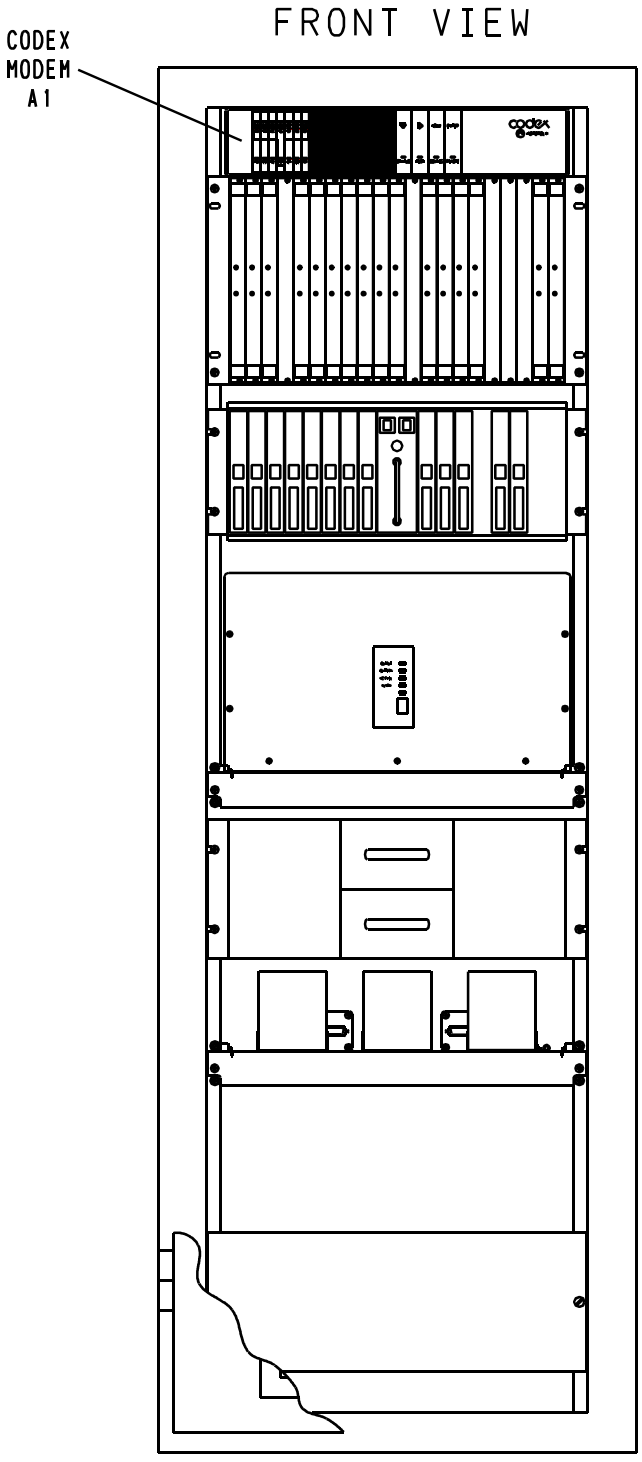

Figure 13.1.2. Codex 3600 Series Modem Location in the ACU

13.1.2.2 **System Components**. The Codex 3600 Series modem consists of the 3600 modem, including the circuit boards contained in the 3600 modem enclosure, and the Flex-cartridge. The modem with its Flex-cartridge and the Flex-cartridge itself are field replaceable units (FRU's). Figure 13.1.4 illustrates the 3600 modem components.

13.1.2.2.1 **3600 Series Enclosure**. The Codex 3600 Series modem enclosure includes the front panel, power supply, cooling fan, and backbone slots for all of the cards. The front panel is used to configure the device and includes light emitting diodes (LED's), touch-sensitive control keys, and an 8-character alphanumeric display. The rear panel includes the power switch, fuse, power cord, voltage selection jumper, telephone company connections, hardware interfaces to network control, and data terminal equipment connections.

13.1.2.2.2 **Flex-Cartridge**. The Flex-cartridge consists of multiple banks of memory devices packaged in a component housing. These memory banks contain the associated operating programs that perform specific functions. The memory size varies, depending on the number of installed software options. The initial Flex-cartridge is factory-installed. If software upgrades are required, the cartridge is removed and replaced with the cartridge containing the new software. Each cartridge plugs into a Flex-cartridge carrier on the front right side of the processor card. ASOS sites that communicate with ADAS in a point-to-point circuit have Premium Flex-cartridges, and those communicating in a multipoint circuit have Standard cartridges.

13.1.3 CODEX CONFIGURATIONS

There are two possible configurations of the Codex Modem: Standard (one mode: MP-S) and Premium (two modes: Turbo PP and V.33). The configuration of a particular CODEX is determined by which of two Flex-cartridges (Standard or Premium) has been installed in the Codex. The Standard Flex-cartridge is used when the Codex is connected to ADAS in a multipoint configuration. The Premium Flex-cartridge is used when the Codex is connected to ADAS in a point-to-point configuration. More information can be learned about Flex-cartridges and their effect on Codex configurations in section IV.

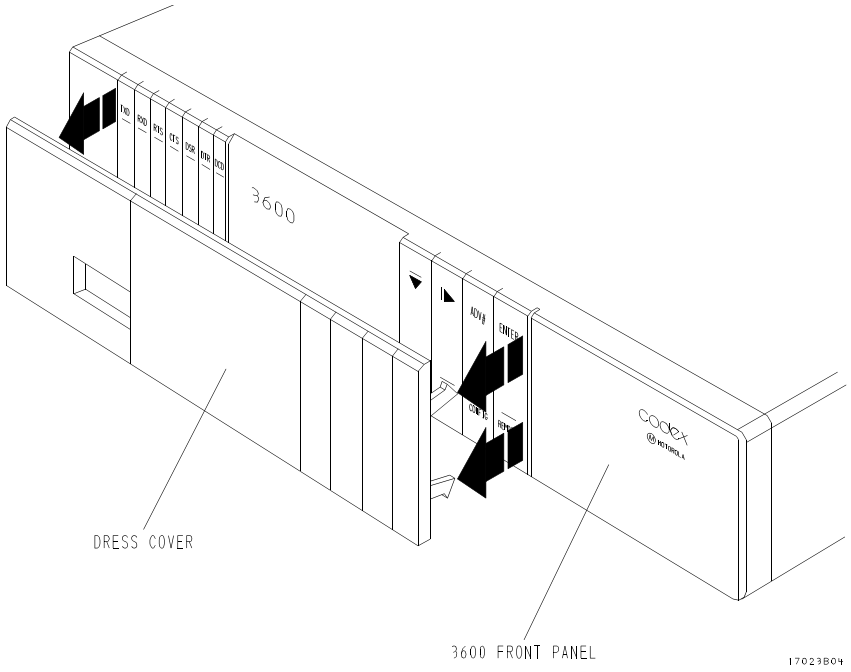

Figure 13.1.3. Codex 3600 Series Modem Dress Panel

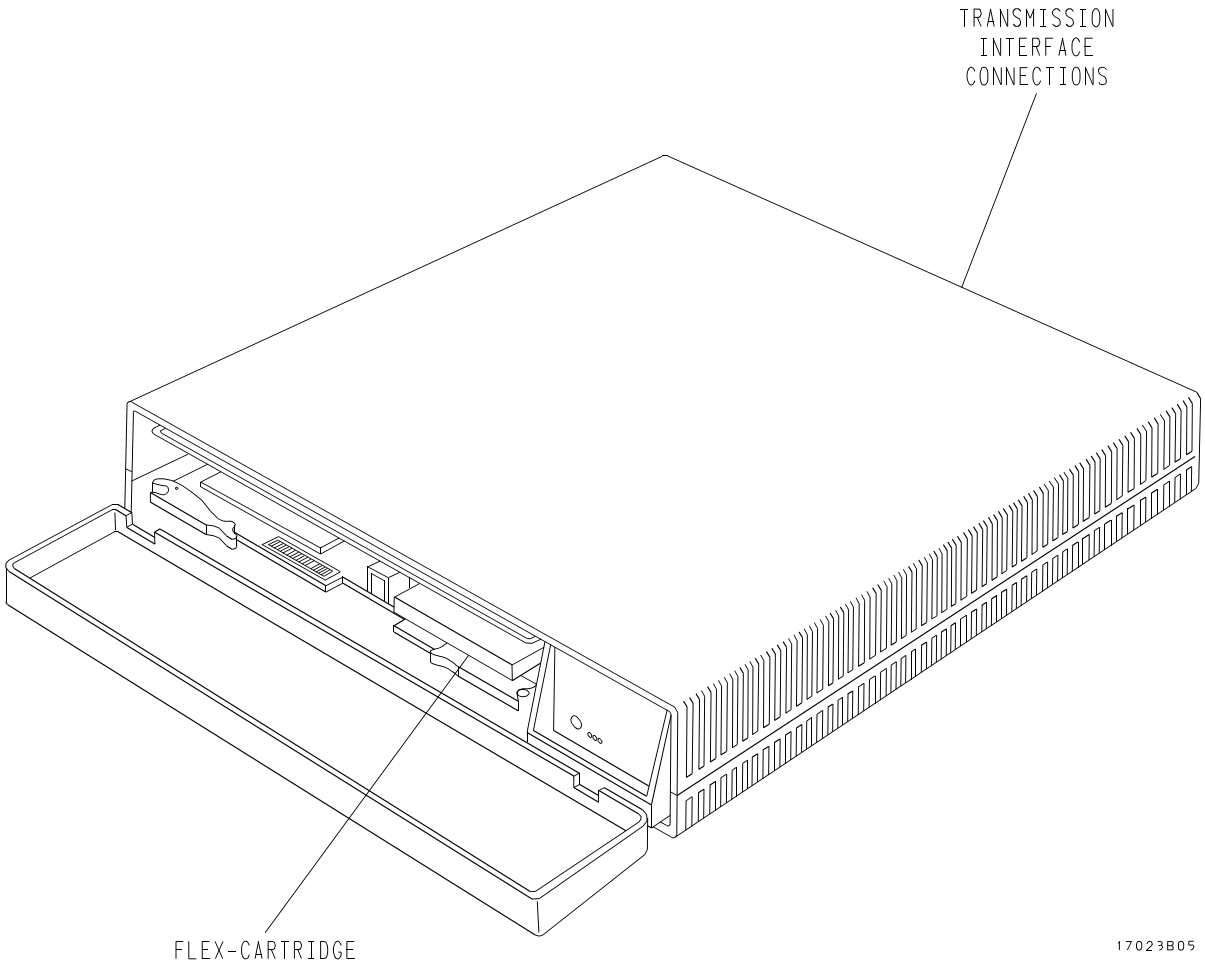

Figure 13.1.4. Codex 3600 Series Modem Components